CLAIMS

What is claimed is:

1. A control system for remotely actuating a laser processing head comprising:

a laser processing head;

an actuation mechanism located remotely from said laser processing head; and

a translation mechanism connected between said laser processing head and said actuation mechanism, said translation mechanism translating movement of said actuation mechanism into movement of said laser processing head.

2. The control system of claim 1 wherein said translation mechanism comprises:

a cable control having a first end coupled to said laser processing head and a second end coupled to said actuation mechanism.

3. The control system of claim 2 wherein said laser processing head is slidably coupled to a robot arm, said actuation mechanism imposing relative linear motion of said laser processing head with respect to said robot arm.

4. The control system of claim 1, further comprising an actuator control system for controlling said actuation mechanism.

5. The control system of claim 1, further comprising a height sensing system including:

a height sensor for generating a height signal based on a measurement between said laser processing head and a work-piece; and

a height sensor electronics module located remotely from said height sensor and receiving said height signal.

6. The control system of claim 5, wherein said height sensing system further includes a wire communicating said height signal between said height sensor and said height sensor electronics module.

7. The control system of claim 5 wherein said actuator control system is in communication with said height sensing system wherein said height sensor signals said actuator control system to direct said actuation mechanism to actuate said laser processing head based on said height signal generated by said height sensing system.

8. The control system of claim 2 wherein said second end of said cable control is coupled to a roller screw mechanism of said actuation mechanism.

9. The control system of claim 2 wherein said cable is biased in a direction away from said actuation mechanism.

10. The control system of claim 9 wherein said cable is biased away from said actuation mechanism by an air cylinder.

11. A remote control system for actuating a tool in one dimension in response to a distance measurement between the tool and a work-piece wherein the distance between the tool and the work-piece is measured by a height sensing system wherein the height sensing system is disposed at least in part in the tool, the remote control system comprising:

a translation mechanism comprising a first member end and a second member end wherein said first member end is coupled to the tool for actuating the tool in one dimension;

an actuation mechanism coupled to the second member end for actuating the tool wherein said actuation mechanism is remote to the tool and therefore not connected to the tool; and

a control system for controlling said actuation mechanism wherein said control system is in communication with the height sensing system for sensing a distance between the tool and the work-piece wherein the height sensing system signals said control system to direct said actuation mechanism to actuate the tool in accordance with the distance measured by the height sensing system.

12. The remote control system of claim 11 wherein the tool comprises one of a laser processing head, a gluing head, a plasma head and a wire feed welding head.

13. The remote control system of claim 11 wherein said translation mechanism comprises:

a cable control having a first end coupled to said tool and a second end coupled to said actuation mechanism.

14. The remote control system of claim 11 wherein said actuation mechanism includes a roller screw mechanism.

15. A method for laser processing a work-piece comprising:

providing a laser processing head wherein the laser processing head is coupled to a control system for directing movement of said laser processing head over the work-piece wherein the laser processing head further comprises a sensor for measuring the distance between said laser processing head and the work-piece;

measuring the distance between said sensor and the work-piece;

generating movement of an actuation mechanism located remotely from said sensor based on said measured distance; and

translating said movement of said actuation mechanism into linear motion of said laser processing head toward and away from said work-piece.

16. The method of claim 15 further comprising:

communicating said measured distance from said sensor to a height sensing electronics module; and

communicating a signal based on said measured distance from said height sensing electronics module to said actuation mechanism.

17. The method of claim 15 wherein translating said movement of said actuation mechanism comprises:

imposing movement from said actuation mechanism onto a translation mechanism interconnected between said actuation mechanism and said laser processing head; and

linearly actuating said laser processing head based on movement communicated through said translation mechanism.

18. The method of claim 17 wherein linearly actuating said laser processing head comprises:

imposing a force onto said laser head thereby imposing relative linear motion of said laser processing head with respect to a robot arm supporting said laser processing head.

19. The method of claim 17 wherein linearly actuating said laser processing head includes imposing a force on a cable control connected between said actuation mechanism and said laser processing head.

20. A laser for performing a processing operation comprising:

a laser processing head coupled to a robot arm;

a height sensor disposed in said laser processing head for generating a height measurement between said laser processing head and a work-piece; and

a slide mechanism providing relative linear movement between said laser processing head and said robot arm based on said height measurement, said slide mechanism linearly actuated by an actuation mechanism remotely located from said laser processing head.